MILITARY STANDARD

AIRCRAFT INTERNAL TIME DIVISION
COMMAND/RESPONSE MULTIPLEX DATA BUS

TO ALL HOLDERS OF MIL-STD-1553B.

1. THE FOLLOWING PAGES OF MIL-STD-1553B HAVE BEEN REVISED AND SUPERSEDE THE PAGES LISTED:

NEW PAGE	SUPERSEDED PAGE	DATE
iii	iii	21 September 1978
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2. THE FOLLOWING NEW PAGES ARE TO BE INSERTED AS LISTED:

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3. RETAIN THIS NOTICE PAGE AND INSERT BEFORE THE TABLE OF CONTENTS.

4. Holders of MIL-STD-1553B will verify that page changes indicated above have been entered. The notice page will be retained as a check sheet. This issuance, together with appended pages, is a separate publication. Each notice is to be retained by stocking points until the Military Standard is completely revised or cancelled.

5. This notice is applicable to all U.S. Air Force aircraft internal avionics activities.

Custodian:
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Project MISC-FD32

FSC MISC

FOREWORD

This standard contains requirements for aircraft internal time division command/response multiplex data bus techniques which will be utilized in systems integration of aircraft subsystems. Even with the use of this standard, subtle differences will exist between multiplex data buses used on different aircraft due to particular aircraft mission requirements and the designer options allowed in this standard. The system designer must recognize this fact, and design the multiplex bus controller hardware and software to accommodate such differences. These designer selected options must exist, so as to allow the necessary flexibility in the design of specific multiplex systems in order to provide for the control mechanism, architecture redundancy, degradation concept and traffic patterns peculiar to the specific aircraft mission requirements. * Appendix Section 20 selects those options which shall be required and further restricts certain portions of the standard for use in Air Force aircraft internal avionics applications.

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APPENDIX FIGURES

10.6 Use of broadcast option. The use of a broadcast message as defined in 4.3.3.6.7 of this standard represents a significant departure from the basic philosophy of this standard in that it is a message format which does not provide positive closed-loop control of bus traffic. The system designer is strongly encouraged to solve any design problems through the use of the three basic message formats without resorting to use of the broadcast. If system designers do choose to use the broadcast command, they should carefully consider the potential effects of a missed broadcast message, and the subsequent implications for fault or error recovery design in the remote terminals and bus controllers.

* 20. General. This appendix is applicable to all U.S. Air Force aircraft internal avionics activities. The intent of the appendix is to select those options which shall be required and to further restrict certain portions of the standard for use in Air Force avionics. References in parenthesis are to the paragraphs in the standard that are affected.

* 20.1 Mode codes. (4.3.3.5.1.7) The mode codes for dynamic bus control, inhibit terminal flag bit, override inhibit terminal flag bit, selected transmitter shutdown and override selected transmitter shutdown shall not be transmitted on the data bus by bus controllers in Air Force avionics applications. However, these mode codes may be implemented in remote terminals for Air Force avionics applications.

* 20.2 Broadcast command. (4.3.3.6.7) The broadcast command shall not be transmitted on the data bus by bus controllers in Air Force avionics applications. However, this message format may be implemented in remote terminals. If the broadcast message format is implemented in a remote terminal, then that terminal shall also implement the transmit status word mode code as specified in 4.3.3.5.1.7.3. Note that the remote terminal address of 11111 is still reserved for broadcast, and shall not be used for any other purpose in Air Force Avionics applications.

* 20.3 Mode code indicators.

* 20.3.1 Bus controllers. (4.4.2) In Air Force avionics applications, the bus controller shall be able to utilize both 00000 and 11111 in the subaddress/mode field as defined in 4.3.3.5.1.7. In addition, if a bus controller is required to utilize any mode code in its operation, then it shall be required to implement the capability to utilize all mode codes.

* 20.3.2 Remote terminals. (4.4.3.1) All RT's which are designed for Air Force avionics applications, and which implement mode codes, shall respond properly to a mode code command, as defined in 4.3.3.5.1.7, with 00000 in the subaddress/mode field. In addition, such RT's may also respond to 11111 in the subaddress/mode field as a designer option. See Section 20.8.1 for design considerations relating to the 11111 mode code indicator.

* 20.4 Data bus cable.

* 20.4.1 Shielding (4.5.1.1) The cable shield shall provide a minimum of 90.0 percent coverage.

* 20.4.2 Characteristic impedance. (4.5.1.2) The actual (not nominal) characteristic impedance shall be within the range of 70.0 Ohms to 85.0 Ohms at a sinusoidal frequency of 1.0 megahertz (MHz).

* 20.5 Cable coupling. (4.5.1.5.1.3) For Air Force avionics applications, the continuous shielding shall provide a minimum of 90.0 percent coverage.

* 20.6 Direct coupled stubs. (4.5.1.5.2) Direct coupled studs shall not be utilized in Air Force avionics applications.

* 20.7 Redundant data bus requirements. (4.6) Dual standby redundant data buses as defined in 4.6.3 shall be utilized. There may be more than two data buses utilized but the buses must operate in dual redundant data bus pairs. 4.6.1 and 4.6.2 shall also apply.

* 20.8 Design considerations. Avionics designed for Air Force applications may be required to interface to existing avionics systems which were designed to preceding versions of the standard (e.g., the F-16 avionics suite). In this case, downward compatibility problems between the new avionics and the existing system can be minimized through the consideration of three key items:

* 20.8.1 Mode code indicator. In some existing systems, such as the F-16, the bus controller uses 11111 to indicate a mode code command. The designer may wish to implement the capability in the new avionics to respond to 11111 mode code commands, in addition to the required capability for 00000 mode code commands.

* 20.8.2 Clock stability. Since this version of the standard relaxed the transmission bit rate stability requirements (4.3.3.3), the avionics designer may wish to return to the stability requirements of the preceding version of the standard. The previous requirements were ±0.01 percent long term and ±0.001 percent short term stability.

* 20.8.3 Response time. This version of the standard also expanded the maximum response time to 12.0 microseconds (4.3.3.8). The designer may also wish to return to the previous maximum response time of 7.0 microseconds as defined in 4.3.3.8 of this version of the standard.